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NEST MATERIAL REUSE BY *PARACHARTERGUS* R. VON IHERING (HYMENOPTERA: VESPIDAE)

Social wasps (Vespidae) construct their nests of vegetable fiber (a few tropical species utilize mud). Using water to soften the fibers at the source, foragers use their mandibles to scrape up a wad of wet pulp, which is carried back to the nest. The mass is mixed with a salivary adhesive and formed into the cells and envelope. The adhesive secretion forms a thin matrix that binds the fibers together and confers a water repellency to the finished carton.

Nest construction and maintenance is dangerous since it requires numerous trips of workers for material location and transportation (Jeanne, 1986). Nevertheless few species reprocess nest material from one part of the nest for use in other parts during normal nest expansion. *Belonogaster* and *Vespula* spp. tear down inner layers of envelope for use in constructing new cells (Gadagkar, 1991, Greene 1991; Wenzel, 1991). Nest material reuse has also been found in several *Polistes* species as *P. annularis* (L. 1763), *P. metricus* Say, 1831 in the United States, *P. olivaceus* (Degeer, 1773) in Madagascar, *P. dominulus* (Christ, 1791) in Europe (Wenzel, pers. comm).

However, to date few species have been reported to salvage material from an

abandoned nest for use in new construction. Richards & Richards (1951) say for *P. fraternus*, "The wasps were busily engaged in eating away the old envelope, of which about one-third had already gone by 9.0 a.m. The material was being used to build the new nest."; perhaps this is the only published reference. When nests are abandoned, they are left to weather away and converted into habitat for other animals. I now report that *Parachartergus*, a Neotropical swarm-founding species, is an exception to this rule. I observed this behavior in *P. fraternus* and in *P. colobopteris* in Colombia. Wasps were determined using the keys in Richards (1978). Vouchers have been deposited in the collection of the Instituto de Ciencias Naturales of the Universidad Nacional de Colombia, Santafé de Bogotá (ICN-MHN).

An active colony of *P. fraternus* was observed in December, 1995, in the rain forest of the Sierra Nevada de Santa Marta, Magdalena (11°5'5"N, 73°55'00"W) at an elevation of 1,100–1,200 m. The nest was constructed on the trunk of a *Bactris macana* (Mart.) Pittier palm 1.8 m above the ground. The envelope was 60 cm in length, including the long downward-extending entrance tube. The carton of the envelope was typical of the species (Richards 1978), dark gray in color with corrugations running perpendicular to the longitudinal axis at the center. The entrance had oblique corrugations.

Early in the morning of the day after discovery, I found the nest with its envelope torn widely open and several of the 10 combs missing, strongly suggesting attack by a vertebrate during the night. The adult wasps were gone, but during the day wasps were observed to arrive at the nest, cut pieces from the envelope, and chew these into masses of pulp. I was unable to see if these wasps wet the surface of the carton with water to soften it before removal but the appearance was of a rather maleable and darker material than the original. All laden wasps flew off in the same direction, evidently to where the swarm was constructing a new nest. I saw a maximum of three wasps in the nest at the same time. As with *P. fraternus* colonies in Costa Rica, they salvaged the envelope but left the combs intact (Bouwma, A. pers. comm.).

The colony of *P. colobopteris* was discovered in January, 1998, in disturbed rain forest in a the private natural park of Rio Claro, San Luis, Antioquia (6°2'40"N, 75°00'00"W) at an elevation of 410 m. The nest was 3 m up on the trunk of a tree (40 cm diameter). The envelope was 27 cm long by 16 cm wide, reddish-brown in color and with irregular corrugations, not ridged, conforming to the published descriptions (Richards, 1978).

On April 10, 1998, the nest was raided by a colony of *Eciton hamatum* (Fabricius, 1804), forcing the adult wasps to abandon it. By 1500 hr the ants had removed all larvae from the nest and only one or two ants were still on the nest. By the next day wasps were seen to arrive at the nest and cut pieces of envelope in the same manner as described for *P. fraternus*. By that evening, they had succeeded in salvaging about 30% of the envelope. The nest contained twelve combs, including some formed from the fusion of two. Almost all combs contained cells with meconia, indicating that the nest had produced adult offspring.

Why do colonies of *Parachartergus* salvage material from their abandoned nests, while virtually all other tropical species use only new material? There is considerable variability among species with respect to the durability of their nest carton. The carton produced by *Parachartergus* is particularly tough. Nests can be occupied for

up to 16 years (Starr, 1976; Jeanne, 1980; Turillazzi, 1980; García, 1978). Examined under a stereomicroscope, the fibers from the envelope of the *P. colobopterus* nest described above were long and uniform, appearing to have come from a single type of plant source. Perhaps such long fibers are costly to extract from their source, yet are durable, making salvaging them from abandoned nests a less-costly process than collecting the raw material.—Carlos E. Sarmiento-M. M. Sc., Fundación Nova Hylaea, A. A. 52656, Santafé de Bogotá, D.C., Colombia, S.A., E-mail: cesarmiento@yahoo.com.

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